OMSAPC ADVISORY CIRCULAR

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF AIR AND WASTE MANAGEMENT

Subject: "Prohibition of Emission Control Defeat Devices" - Optional Objective Criteria

I. Purpose

The purpose of this advisory circular (A/C) is to provide optional objective criteria to the manufacturers to assist the manufacturers and EPA in evaluating any Auxiliary Emission Control Device (AECD) which may be questionable. This A/C supplements and does not supersede A/C No. 24 which remains in effect.

II. Background

A. On December 11, 1972, A/C 24 was published. In that A/C, guidelines and policy were discussed that dealt with the subject of defeat devices, which are defined as AECD's that reduce the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal urban vehicle operation and use, subject to some considerations outlined in A/C 24. 40 CFR 86.079-22 specifically prohibits the incorporation of defeat devices in vehicles or engines described by an application for certification.

B. Since A/C 24 was published in 1972 (almost six years ago), two developments have occurred which have indicated the need to provide additional guidance to the manufacturers regarding defeat devices.

1. The first development has been in the implementation of A/C 24. A/C 24 is somewhat general. This has necessarily led to situations in which EPA personnel may have had to make judgmental decisions about the acceptability/nonacceptability of various AECD's on a case-by-case basis. It would appear that giving manufacturers the opportunity to elect to have defeat device issues evaluated against an objective criterion would be desirable.

2. The second development has been the rapid advance in the introduction of more sophisticated emission control systems, especially those that offer new flexibility in control capability. The most obvious example of this new technology has been the rapid introduction of electronic control and modulation devices. It is EPA's judgment that the application of electronic controls for emission control and other reasons on motor vehicles and engines will increase substantially in the next few years, and in the early 1980's most, if not all, motor vehicles and engines will incorporate some sort of electronic control system.

C. 1. When A/C 24 was published, most, if not all, AECD's were much less sophisticated than current and future systems and were easier to evaluate on a subjective basis. For example, the use of a temperature sensing switch on the doorpost of a vehicle that was used to trigger a significant loss of emission control when ambient temperatures were outside the FTP range was relatively easy to evaluate.

2. Now, however, EPA is faced with the task of evaluating electronic control systems which may receive inputs from multiple sensors and control multiple actuators that affect the emission control system's performance. It is clear that such emission control sytems are AECDs under the definition of A/C 24, and the problem that EPA is faced with is determining which systems represent defeat devices and which systems do not. Using A/C 24 to evaluate the types of devices that were in question during 1972 was relatively straightforward, but the elements of design which are important in the evaluation of the new technology may not be hardware items. Such elements of design could be control system logic (i.e., computer software), and/or calibrations, and/or hardware items.

3. While the greater flexibility of the new technology could be used to improve emission control capability, there is concern on EPA's part that the new technology may result in reductions in the effectiveness of emission control systems. The California Air Resources Board came to a similar conclusion in a Staff Report.*

D. Given the complicated nature of the new technology, and the difficulty of evaluating the overall emission impact of multiple, continuously variable emission control system parameters, an optional procedure that could be elected by the manufacturers may be needed to assist the manufacturers in receiving timely and consistent evaluation of this complex new technology.

III. Applicability

This advisory circular supplement is effective as an option available to manufacturers of 1980 and later model year light-duty vehicles and light-duty trucks.

IV. Optional Objective Criteria for Determinations on Defeat Devices

A. The following guidelines set forth the showing by a manufacturer which EPA would view as demonstrating that an AECD is not a defeat device with respect to NOx within Federal Test Procedure (FTP) temperatures. In order to successfully utilize this option, each tested vehicle which contains a given questionable AECD would be expected to satisfy the appropriate criterion.

*State of California Air Resources Board Staff Report, 78-1-3, December 23, 1977.

1. For an element of design whose NOx emissions during conditions reasonably expected to be encountered in normal urban vehicle operation and use within FTP temperature ranges is of concern, a manufacturer may elect to demonstrate that the NOx emissions of the vehicle or vehicles in question are less than or equal to the following guidelines values. The test cycle used to generate the emission values is the Highway Fuel Economy Test (HwFET).

FTP Temperature Range

HwFET NOx Guidelines

Vehicle Type	Guideline*
Light-Duty Vehicles	1.22 times the applicable FTP NOx standard
Light-Duty Trucks	1.28 times the applicable FTP NOx standard

V. Defeat Device Determination for Devices Identified as Suspect Under the Guidelines of Advisory Circular No. 24

A. For those devices which EPA has identified as potential defeat devices by the criteria set forth in 40 CFR §86.079-22 and Advisory Circular No. 24 (with respect to their effect on NOx emissions at highway speeds):

1. The manufacturer may choose not to use the HwFET NOx guidelines criteria to satisfy EPA that the device is not a defeat device. In those cases, EPA will make a determination whether the device is or is not a defeat device based upon criteria set forth in the regulations and Advisory Circular No. 24. However, the manufacturer's decision not to use the HwFET NOx guidelines will not preclude EPA from taking highway NOx emissions into account as is currently the practice. In this case, EPA will not use HwFET NOx performance as a firm, objective basis for deciding the acceptance of a potential defeat device but rather as additional information to assist EPA in making its decision in the context of A/C 24. If EPA ultimately determines that the device will not be considered a defeat device, this determination will be valid for that device for the entire product line as described in the manufacturer's application for certification. Likewise, a device that is ultimately determined a defeat device will be judged a defeat device for the entire product line.

2. The manufacturer may choose to use the HwFET NOx guidelines to demonstrate that the device should not be considered a defeat device. EPA will then monitor the HwFET NOx levels on certification and fuel economy vehicles (emission-data, running change, and fuel economy data vehicles) which incorporate the device. If the resulting HwFET NOx levels are less than or equal to the appropriate guideline levels, EPA will

*For all guideline values in this A/C, the resultant product is to be rounded to the same number of significant figures as the applicable FTP requirement.

not judge that specific vehicle to incorporate a defeat device with respect to highway NOx emissions within FTP temperatures. However, because a specific device can be used with different vehicle calibrations or itself be calibrated in many different ways, EPA will withhold judgment on the device in general. If the resulting HwFET NOx level is greater than the established levels, the manufacturer (according to paragraph F, below) must demonstrate to EPA why the device as applied to the specific vehicle and calibration, in light of the data from emission-data, fuel economy data, or running change vehicles, should not be a defeat device under the general provisions of A/C 24.

VI. Actions to be Taken if a Device Is Determined to be a Potential Defeat Device

A. If, prior to the issuance of a certificate, a device is determined to be a potential defeat device, EPA will withhold issuance of a certificate of conformity until the issue is resolved.

B. If the device is determined to be a potential defeat device under the provisions of A/C 24, and at the manufacturer's option has been qualified and accepted for certification within an engine family based on HwFET levels which do not exceed the NOx guideline, EPA may take further action if additional data generated subsequent to certification of an engine family exceed the HwFET NOx guideline. Potential sources of such data include emission results on fuel economy data vehicles. In such cases, EPA will:

1. Normally disallow the use of the HwFET NOx guideline for future demonstration during that model year (i.e., for running change approval) that the device in question should not be considered a defeat device within that engine family. The criteria that would be used to evaluate such subsequent running changes would be the general guidelines in the regulations and A/C No. 24.

2. Deny any unapproved request for carryover or carry-across of any data from the engine family which included the vehicles exhibiting HwFET levels above the NOx ratio guidelines.